

# Current Zero Energy Ready Home (ZERH) Single Family Homes Version 2 Policy Record

**Last Updated: June 23, 2023**

## How to Use this Document

DOE regularly receives partner questions and comments regarding various aspects of the program documents. This document is a record of significant issues that have been received since the release of the last revision to the program documents. These issues are either pending resolution by DOE or have been resolved, sometimes resulting in modifications that will be incorporated into the next revision of the program documents. The primary purpose of this document is to allow all partners to have equal access to the latest policy issues and resolutions.

DOE intends to formally incorporate policy modifications into the next revision of the program documents. Those edits will then be enforced for homes permitted after a specified transition period, typically 60 days from the release of the revised program requirements. Partners may, at their discretion, use the determinations in this document immediately, in advance of the formal implementation dates. If they do so, they should be sure to document the permit dates of the affected homes and to include a copy of the policy record in the files retained by the Verifier or Rater. Should the need arise, this will allow partners to demonstrate that they acted with the best information available.

## Definitions

Each issue listed here is classified as a Change, Clarification, Refinement, Comment, or an Issue Under Review. These are defined as follows:

- Change: The addition, deletion, or modification of a program requirement. A change will typically result from a partner question or feedback indicating that DOE's original intent is not being met or from changes in relevant standards. A change is the most significant type of edit for partners because it is likely to change the way that partners comply with the program.
- Clarification: The clarification of a program requirement, typically resulting from a partner question indicating confusion or ambiguity. Clarifications are not intended to significantly change the scope of the program guidelines, but rather to clarify the original intent of the requirement. A clarification is secondary in importance to a change; it should not significantly alter the way that most partners comply with the program.
- Refinement: A minor revision, such as an improved choice of words, a grammatical correction, or a correction to a typographical error. A refinement is the least important type of edit; it should have no impact on the way that partners comply with the program.
- Comment: A comment provided by DOE in response to a question, which results in no change to the program documents. This may occur, for example, if the question can be by referring to already established policy. Aside from the partner asking the question, such comments will typically have no impact on the way that partners comply with the program.
- Issue Under Review: An issue that has been submitted and that DOE is still evaluating. Once DOE has evaluated the issue, it will offer a resolution and reclassify the issue using one of the four categories above.

## Current Zero Energy Ready Home (ZERH) Single Family Homes Version 2 National Program Policy Record

ID	SFV2.001	Log Date	6/23/2023	Classification	Change
Program Document(s) Affected		National Program Requirements (Version 2), ERI Target Procedure (Version 2)			
Topic	Target Home window SHGC factors in climate zones 4-8.				
Issue	<p>A Solar Heat Gain Coefficient (SHGC) of 0.40 is used to configure the Zero Energy Ready Home Single Family Target Home in climate zones 4-8. This aligns with the requirements in ENERGY STAR Single Family New Homes Version 3.2, Rev.12.</p> <p>However, windows with the U values specified for these climate zones are not as commonly associated with this magnitude of SHGC, and those windows that do have higher SHGCs are generally more appropriate for use in designs that are orientation specific. The stringency of the ZERH National Version 2 Target Home makes it difficult to compensate when lower (and more common) SHGC windows are used.</p> <p>A SHGC of 0.30 is commonly available in double pane window products that offer an appropriate balance between low U-factors and moderate SHGC in cold climates. This change to the SHGC value in Climate Zones 4 – 8 will be consistent with changes in the ENERGY STAR Single Family New Homes program.</p>				
Resolution	<p><b>The SHGC values in the ZERH National Program Requirements Version will be revised as follows:</b> <del>0.40</del> <u>0.30</u> in Climate Zones 4A and 4B. <del>Any</del> <u>0.30</u> in Climate Zones 4C, 5-8</p> <p><b>The SHGC values in the ZERH ERI Target Procedure Version 2 will be revised as follows:</b> <del>0.40</del> <u>0.30</u> in Climate Zones 4 - 8</p>				
ID	SFV2.002	Log Date	6/23/2023	Classification	Clarification
Program Document(s) Affected		National Program Requirements (Version 2)			
Topic	Requirement to use ‘adaptive recovery’ thermostats with air source heat pumps				
Issue	<p>The current endnote 33 requires the use of programmable thermostats with ‘adaptive recovery’ when they are used with air source heat pumps, which is intended to refer to thermostats that are capable of learning how long the heat pump takes to reach the programmed temperature settings and automatically turn on the heat pump with adequate lead time for the home to reach the set point on schedule without requiring excessive electric back-up heating. Many newer thermostats from a variety of manufacturers come with this functionality although it may be referred to using different terminology, such as “recovery mode.”</p>				

Resolution	<b>The endnote associated with the thermostat properties in Exhibit 2 will be updated as follows:</b> In homes with heat pumps with electric resistance back-up heating, programmable thermostats shall <u>incorporate controls have "Adaptive Recovery" technology</u> to prevent the excessive use of electric back-up heating. <u>This functionality may be described as adaptive recovery, recovery mode, or similar terms.</u>				
ID	SFV2.003	Log Date	6/23/2023	Classification	Change
Program Document(s) Affected		National Program Requirements (Version 2), National Rater Checklist (Version 2)			
Topics	EV Charging for parking spaces that are not private driveways or garages, and the distance between an EV charging receptacle and a private driveway.				
Issue	<p>Some single-family homes, duplexes, and townhomes do not have private driveways or garages, but instead have parking spaces in a parking lot associated with the community. These parking spaces may be assigned to specific homes or be open to general use. The current EV Ready mandatory requirement is unclear for this scenario and could be construed as not requiring any EV Charging infrastructure. However, the intent of the requirement is that residences without private driveways or garages should still include EV Ready provisions.</p> <p>Additionally, the 3-foot distance requirement between the EV charging receptacle and the private driveway is closer than is necessary considering the length of charging cords.</p>				
Resolution	<b>The Electric Vehicle Ready provision in the National Program Requirements (V2) and in the National Rater Checklist (V2) will be updated as follows:</b>				
Electric Vehicle Ready		One parking space is provided per dwelling unit that includes a powered 208/240V, 40A receptacle installed in <u>dwelling unit's garage or within 3 6 feet of private driveway or dedicated parking space</u> . The electric service panel identifies the branch circuit as "Electric Vehicle Charging" (1). <u>For other parking configurations, see endnote (2).</u>			
<p>(1) If the addition of the 40-amp Electric Vehicle Charging branch circuit increases the electrical service to the next nominal size (i.e., from 200-amp to 400-amp service), connecting the circuit to the electrical panel is not required. The conductor shall be labeled as "electrical vehicle charging." The Rater shall retain a copy of the electrical sizing calculations or statement from the electrical designer for their records but need not evaluate the documentation. <u>Where the local electric distribution entity has certified in writing that it is not able to provide 100% of the necessary distribution capacity that would be needed according to this requirement within 2 years after the estimated date of the certificate of occupancy, the required EV charging infrastructure shall be reduced based on the available existing electric distribution capacity. The Rater must include the utility's written explanation in the project records. Where meeting the capacity requirements to satisfy this requirement will alter the local utility infrastructure design requirements on the utility side of the meter so as to increase the utility side cost to the builder or developer by</u></p>					

more than \$450 per dwelling unit, the required EV charging infrastructure shall be reduced based on the available existing electric distribution capacity. The Rater must include documentation from the utility regarding added costs in the project records.

~~Homes without a private driveway or garage are exempt from this requirement.~~

Dwelling units for which no parking is provided by the builder are exempt from this requirement.

(2) Dwelling units in communities that include parking for the dwelling unit (assigned or non-assigned), but do not include a private driveway or garage for the individual dwelling unit, must use the following compliance path:

- Allocated parking for dwelling units shall be provided with an EV Capable space, EV Ready space, or Electrical Vehicle Supply Equipment (EVSE) space for 40% of units or automobile parking spaces, whichever is less. To meet this 40% threshold, the following minimum types of spaces are provided:
  - 10% of parking (based on automobile parking spaces for the dwelling units or the number of dwelling units, whichever is less) shall be EVSE spaces. Round up to the next whole number of parking spaces.
  - The remaining 30% of the total shall be any combination of EVSE, EV Capable, or EV Ready spaces. Round up to the next whole number of parking spaces.

When determining the total number of spaces, do not include in the calculation spaces in parking lots or parking garages where the cost of the energy use of the parking lot or garage is not the responsibility of the Builder/Developer, Building Owner or Property Manager.

Electric Vehicle Supply Equipment (EVSE) is defined as: "Equipment for plug-in power transfer including the ungrounded, grounded, and equipment grounding conductors, and the electric vehicle connectors, attachment plugs, personal protection system and all other fittings, devices, power outlets or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the electric vehicle." Under this compliance path, installed EVSE must be located within 3 feet of each EVSE space it serves. The branch circuit serving an individual space EVSE shall have a rated capacity not less than 8.3kVA (40A at 208/240V). EVSE serving multiple EVSE spaces is permitted.

An Electric Vehicle Ready Space (EV-ready space) is defined as: "An automobile parking space that is provided with a branch circuit and either an outlet, junction box, or receptacle, that will support an installed EVSE." Under this compliance path, branch circuits serving EV Ready spaces must terminate at an outlet or enclosure located within 3 feet of each EV Ready space it serves. The branch circuit serving an EV Ready space must have a rated capacity not less than 8.3kVA (40A at 208/240V).

An Electric Vehicle Capable Space (EV-capable space) is defined as: "A designated automobile parking space that is provided with electrical infrastructure, such as, but not limited to, raceways, cables, electrical capacity, and

	<u>panelboard or other electrical distribution equipment space, necessary for the future installation of an EVSE.” Under this compliance path, EV Capable Spaces must consist of a continuous raceway or cable assembly installed between an enclosure or outlet located within 3 feet of the EV Capable space and a suitable panelboard or other onsite electrical distribution equipment. The following exceptions to the 3 feet requirement apply:</u> <ul style="list-style-type: none"><li>• <u>Parking spots in a covered garage are deemed EV-Capable if the conduit terminates anywhere within the garage on that parking level.</u></li><li>• <u>Projects with a common area electrical room may have the conduit terminate anywhere within the electrical room.</u></li></ul>						
ID	SFV2.004	Log Date	6/23/2023	Classification	Change		
Program Document(s) Affected		National Program Requirements (Version 2), National Rater Checklist (Version 2)					
Topics	Water Heating Efficiency Requirements with updates for: <ul style="list-style-type: none"><li>• Addressing solar water heating system requirements</li><li>• Adjusting stored volume limits</li><li>• Adding an option for WaterSense certified homes</li></ul>						
Issues	<p><b>Solar Water Heating Requirements:</b> ZERH Single Family Homes National Program Requirements, Version 2 do not recognize the possible use of solar hot water heaters in meeting the mandatory item “water heater and fixtures meet efficiency criteria” (Exhibit 1, Item 5).</p> <p><b>Stored Volume Limits:</b> as heat pump water heater deployment increases, easing the hot water piping stored volume limit will allow streamlined integration of this technology and still enable high energy savings.</p> <p><b>WaterSense 2.0 Certification:</b> WaterSense certification ensures both energy and water savings, and several of the efficiency measures recognized by ZERH are required for WaterSense. Leveraging the WaterSense certification as an alternate compliance option for ZERH’s water efficiency requirements leverages this companion federal program and recognizes the performance of these homes.</p>						
Resolutions	<p><b>The Water Heating Efficiency in the National Program Requirements (V2) and the National Rater Checklist (V2) will be updated as follows:</b></p> <table><tr><td><b>Water Heating Efficiency</b></td><td><div><input type="checkbox"/> Hot water delivery systems meet efficient design requirements (1) <b>or</b> <input type="checkbox"/> Water heater and fixtures meet efficiency criteria (2) <b>or</b> <input type="checkbox"/> Home is certified under WaterSense Labeled Homes Version 2.0.</div></td></tr></table>					<b>Water Heating Efficiency</b>	<div><input type="checkbox"/> Hot water delivery systems meet efficient design requirements (1) <b>or</b> <input type="checkbox"/> Water heater and fixtures meet efficiency criteria (2) <b>or</b> <input type="checkbox"/> Home is certified under WaterSense Labeled Homes Version 2.0.</div>
<b>Water Heating Efficiency</b>	<div><input type="checkbox"/> Hot water delivery systems meet efficient design requirements (1) <b>or</b> <input type="checkbox"/> Water heater and fixtures meet efficiency criteria (2) <b>or</b> <input type="checkbox"/> Home is certified under WaterSense Labeled Homes Version 2.0.</div>						

- (1) Hot water delivery systems meet..... [no additional changes to this endnote]
- (2) Water heaters and fixtures meet the following efficiency criteria:
- Gas water heaters, if present, shall have a Uniform Energy Factor  $\geq 0.87$
  - Electric water heaters, if present, shall have a Uniform Energy Factor  $\geq 2.2$
  - Solar water heating systems, if present, shall have a minimum solar fraction, as follows:

<u>2021 IECC Climate Zone</u>	<u>1, 2</u>	<u>3, 4A, 4B</u>	<u>4C, 5, 6</u>	<u>7, 8</u>
<u>Minimum Solar Fraction (SF)</u>	<u>0.80</u>	<u>0.64</u>	<u>0.47</u>	<u>0.28</u>

- The solar water heating system's Solar Fraction (SF) must be documented by an OG-300 certification. Alternatively, projects may find an equivalent system in the [OG-300 directory](#) which contains the same OG-100 elements as the chosen system and meets or exceeds the minimum required solar fraction. In this situation, documentation of the OG-100 elements and the comparable OG-300 system must be provided. All systems must be made up of OG-100 tested components.
  - When a solar water heating system meeting these specifications is used, gas and electric water heaters used for backup are exempt from the Uniform Energy Factor (in the two prior sub-items) requirements of 0.87 and 2.2, respectively.
- All showerheads and bathroom sink faucets and aerators shall be WaterSense labeled.
  - The hot water distribution system shall store no more than ~~1-2~~ 1.8 gallons between the hot water source and the furthest fixture. In the case of on-demand recirculation systems, the hot water source is considered as the point at which the branch feeding the fixture branches off the recirculation loop. This storage limit shall be verified by either 1) a calculation using the piping or tubing interior diameter and the system length based on plans, or 2) by a field verification test, using the protocol described in the prior endnote, which demonstrates a minimum temperature rise of 10 °F by the time ~~1-4~~ 2.0 gallons of water is delivered to the furthest hot water fixture.

Projects using this compliance option are not permitted to use hot water recirculation systems which operate continuously or operate based solely on a timer or temperature sensor.

<b>ID</b>	SFV2.005	<b>Log Date</b>	6/23/2023	<b>Classification</b>	Change
<b>Program Document(s) Affected</b>	National Program Requirements (Version 2), National Rater Checklist (Version 2)				
<b>Topic</b>	Exception to the mandatory requirement for ducts located in conditioned space.				
<b>Issue</b>	The ZERH Single Family Version 2 program requires ducts in conditioned space while providing a few exceptions for alternate duct designs. The exception stating that "ducts and air-handling equipment may be located within an uninsulated and unvented crawl space or basement when the applicable dehumidification requirements of the Indoor airPLUS program (Version 1) are met" was originally written for a limited application and the program no longer intends to allow for this design approach given the lack of insulation for the crawlspace.				
<b>Resolution</b>	<b>The National Program Requirements (V2) endnote 17 (e) will be updated as follows:</b>				

	<p><del>a. Ducts and air handling equipment may be located within an uninsulated and unvented crawl space or basement when the applicable dehumidification requirements of the Indoor airPLUS program (Version 1) are met.</del></p> <p><b>The National Rater Checklist (V2) endnote 7 (e) will be updated as follows:</b></p> <p><del>b. Ducts and air handling equipment may be located within an uninsulated and unvented crawl space or basement when the applicable dehumidification requirements of the Indoor airPLUS program (Version 1) are met.</del></p>				
<b>ID</b>	SFV2.006	<b>Log Date</b>	6/23/2023	<b>Classification</b>	Change
<b>Program Document(s) Affected</b>	National Program Requirements (Version 2), National Rater Checklist (Version 2)				
Topic	Program version required for Indoor airPLUS mandatory prerequisite certification.				
Issue	The Indoor airPLUS (IAP) program is currently updating its specifications for Version 2. These updates will likely result in two different levels of IAP certification being available with different requirements. The ZERH program (which currently requires IAP Version 1 certification) is monitoring these changes as they are developed and finalized and will make corresponding adjustments to the indoor air quality-related provisions in ZERH. To allow for more time to assess the IAP Version 2 changes, ZERH will extend the time period during which homes will certify under IAP Version 1 as the ZERH requirement.				
Resolution	<p><b>The end note associated with Indoor airPLUS certification in the National Program Requirements (V2) and the National Rater Checklist (V2) will be updated as follows:</b></p> <p>Homes permitted on or before <del>12/31/2023</del> <u>12/31/2024</u> must certify under the Indoor airPLUS Version 1 program requirements. For homes permitted after <del>12/31/2023</del> <u>12/31/2024</u>, DOE may consider a revision to these program requirements that specifies if an updated version of Indoor airPLUS must be used. See the Indoor airPLUS program site for information on program updates: <a href="https://www.epa.gov/indoorairplus/indoor-airplus-program-documents">https://www.epa.gov/indoorairplus/indoor-airplus-program-documents</a>.</p>				
<b>ID</b>	SFV2.007	<b>Log Date</b>	6/23/2023	<b>Classification</b>	Change
<b>Program Document(s) Affected</b>	National Program Requirements (Version 2), National Rater Checklist (Version 2)				
Topic	Requirement for ENERGY STAR labeled ceiling fans.				
Issue	ENERGY STAR labeled ceiling fans yield modest energy savings when considered as part of a whole building design and can add costs. Limiting builders to use only ENERGY STAR labeled ceiling fans as a mandatory provision reduces program flexibility. The ZERH Version 2 ERI Target Procedure programs the target home to use a ceiling fan with a 122 CFM/Watt fan efficacy if the design home uses a ceiling fan. This efficacy ensures a similar level of efficiency to that of an ENERGY STAR labeled ceiling fan. If the mandatory provision to use only ENERGY STAR labeled ceiling fans is removed, the target home will still account for the efficiency savings of a highly efficient fan while providing more flexibility in how the home's Energy Rating Index threshold is achieved.				
Resolution	<b>The National Program Requirements (V2) Mandatory Item 6, will be updated as follows:</b>				

	<div><div><div><div><div><div></div><div><b>6. Lighting &amp; Appliances</b></div></div></div><div><div><div><input type="checkbox"/> All builder-supplied and -installed refrigerators, dishwashers, clothes washers, and clothes dryers are ENERGY STAR qualified. (1)</div><div><input type="checkbox"/> 100% of builder-installed lighting fixtures and lamps (bulbs) provided are LEDs. (2)</div><div><input type="checkbox"/> All installed bathroom ventilation and ceiling fans are ENERGY STAR qualified. (3)</div></div></div></div></div></div>				
	<div>[no changes to endnotes]</div> <div><b>The National Rater Checklist (V2), Item 6.3, will be updated as follows:</b></div> <div>6.3: All installed bathroom ventilation and ceiling fans are ENERGY STAR qualified. (1)</div> <div>[no changes to endnotes]</div>				
<b>ID</b>	SFV2.008	<b>Log Date</b>	6/23/2023	<b>Classification</b>	Clarification
<b>Program Document(s) Affected</b>		National Program Requirements (Version 2), National Rater Checklist (Version 2)			
Topic	Pre-drywall inspection is always required.				
Issue	ENERGY STAR Single Family New Homes released a Version 3.2 policy record update to clarify that pre-drywall inspection is always required for compliance, as there is no reliable alternative for inspecting framing members, wall insulation installation, and other elements that are hidden after drywall installation. DOE concurs with this approach and incorporates the same clarifying language into the ZERH program documents.				
Resolution	<div><b>In the National Program Requirements (V2) Step 4 of the Certification Process Section will be revised as follows:</b></div> <div>“Using a Rater, verify that all requirements have been met in accordance with the Mandatory Requirements for All Certified Homes and with the inspection procedures for minimum rated features in ANSI / RESNET / ICC 301, Appendix B. <u>This will require a minimum of two inspections: one at pre-drywall and the other at final.</u>”</div> <div><b>In the National Rater Checklist (V2) a new endnote will be added after the “Rater Pre-Drywall Inspection Date” field in the checklist, as follows:</b></div> <div>“Any Item that will be concealed by drywall (e.g., wall insulation) must be verified during the pre-drywall inspection. If drywall is installed prior to the inspection, then it must be entirely removed to fully verify all Items. It is not sufficient to remove only portions of drywall to inspect a subset of areas. Additional information is available in the ENERGY STAR Technical Bulletin: <a href="#">Pre-Drywall Inspection Is Always Required</a>. Some Items can typically only be verified at a later stage of construction than when the pre-drywall inspection occurs (e.g., bath fan airflow). Any Item that has not been verified during the pre-drywall inspection must be verified prior to or during the final inspection.”</div>				



ID	SFV2.009	Log Date	6/23/2023	Classification	Clarification
Program Document(s) Affected		National Program Requirements (Version 2)			
Topic	Eligibility requirements specify detached homes and townhomes.				
Issue	<p>ENERGY STAR Single Family New Homes (SFNH) released a Version 3.2 policy record update to clarify that only detached structures and townhomes are eligible to be certified using the SFNH program. In contrast to Townhouses, which are explicitly defined as attached structures, the definition of Dwelling does not distinguish between detached and attached structures: "...any building that contains one or two Dwelling Units used, intended, or designed to be built, used, rented, leased, let or hired out to be occupied, or that are occupied for living purposes." Through the examples of Dwellings that are listed (single-family homes and duplexes), however, EPA intended to convey that only detached structures are eligible to be certified using the SFNH program.</p> <p>DOE agrees with this approach and incorporates the same clarifying language into the ZERH program documents to align fully with the ENERGY STAR eligibility criteria.</p>				
Resolution	<p><b>The National Program Requirements (V2) eligibility language will be revised as follows:</b></p> <p>The following homes are eligible for qualification under the DOE Zero Energy Ready Home (ZERH) Single Family program: <u>detached</u> Dwellings (1) (e.g., single-family homes, duplexes) and Townhomes (2). These homes may be site-built or modular construction (3).</p> <p>[no changes to endnotes]</p>				

ID	SFV2.010	Log Date	6/23/2023	Classification	Clarification
Program Document(s) Affected		National Program Requirements (Version 2)			
Topic	Use of sampling for ZERH measures.				
Issue	<p>End note 9 in the ZERH V2 National Program Requirements indicates that sampling of ZERH requirements may be possible under the Sampling Protocol of a Home Certification Organization (HCO) for ZERH’s approved sampling protocol. However, the <a href="#">DOE Zero Energy Ready Home Program Certification System for Homes and Apartments Using an Energy Rating Index or Dwelling Unit Modeling Compliance Path</a> clearly states that “townhouses, single family homes, and duplexes are not eligible for sampling.”</p>				
Resolution	<p><b>End note 9 in the ZERH National Program Requirements Version 2 will be revised as follows:</b></p> <p>Sampling of those requirements for ENERGY STAR Single Family New Homes (ESSFNH) and Indoor airPLUS qualification is allowed to the extent permitted by their respective program requirements and allowances for sampling. Sampling of these</p>				

	<p>ZERH program requirements is not allowed for townhouses, single family homes, or duplexes. <del>Rater only sampling of features specific to the DOE ZERH Single Family Home qualification may be conducted in accordance with an HCO for ZERH approved Sampling Protocol.</del></p>
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